The new MycoHarvester (2017 version)

MycoHarvesters are a range of devices designed to harvest beneficial fungal spores safely and efficiently from solid substrates. The new **MycoHarvester 6** is the latest in a series of machines (including the MycoHarvesters 1, 2 and 5) that have been under development for over 20 years, as **research tools for mycopesticide formulation.** However many organisations appear also to have used the MH5 for small/medium-scale production, so the new MycoHarvester 6 (MH6) has been fitted with an upgraded fan unit powered by a small industrial-style motor. This also means that the blower is connected, but separate from, the cyclone and substrate column via a tube: for greater ease of operation and less noise in use.

a MycoHarvester in use

cyclone and substrate column

the new motor and fan unit.

In all other ways the MycoHarvester 6 functions in the same way as the MH5 series: the cyclone has **the same cyclone geometry** to previous versions that have been in use since 2004. They likewise simulate scaled-up mycopesticide production using the MycoHarvester 3 series: which have multiple cyclones of the same geometry, but a different method of substrate agitation, and are capable of processing up to 1 tonne of substrate per day.

The MH6 in contrast, is designed for small-scale batch production of samples for research, or medium scale production (typically processing up to 50 kg of grain substrate per day). Conidia are separated to a high particle size specification and into a form that is easy to desiccate: for further packaging and formulation. Experience in the international LUBILOSA Programme had shown this to be a key process in the development of a commercially acceptable biological insecticide. The principal advantages of MycoHarvesters include:

- Elimination of large (>100 µm) particles which cause blockages in sprayers.
- High quality spore separation, which can enable the development of physically stable formulations (*e.g*. for *Beauveria* and *Metarhizium* spp. >99% of volume 1-60 µm).
- Fast, cost effective processing of beneficial fungi: facilitating better storage by concentrating spores for subsequent thorough drying to increase spore survival.
- Operator safety: spore dust is sucked into the machine.
- Autoclavable (food grade stainless steel) cyclones and collection cylinders.

anti-vibration mounts

substrate inlet and air flow control

The details for the new blower unit are:

- 1.5 kW 3-phase side channel blower mounted on a base frame with anti-vibration mounts, inlet and outlet attenuators, pressure relief valve, inlet filter (protection against ingress of dust and particles if used not connected to cyclone).
- Optional single phase to 3 phase inverter: which is mounted on an end panel, attached to the base frame.
- The inverter requires a single phase 13 amp supply. If an RCD is fitted to the supply, this should be 300 mA or greater.
- If clients have access to 3-phase electricity, it is possible to avoid supply and use of the inverter: making the machine both cheaper and more efficient.
- The electrical lead (cable length 2 m) and plug can be added to required specification– in the UK and Europe we would fit standard BS1363 (13A), CEE 7/4 (Schuko), or BS546 (15A) plugs.
- The cyclone and substrate column are connected via a 3 metre tube (which can be cut to length as required)

Different fungi have different production characteristics. The surface properties and morphology of conidia vary considerably between different fungal species. Before processing, the substrate surface should be dry: but the degree of drying required before processing must be determined experimentally. To date, conidia of the following species of beneficial fungi are known to have been successfully separated from solid substrates using the MycoHarvester, for purification, improved formulation and other processes:

- *Metarhizium* spp. including: *M. anisopliae*, *M . acridum* and *M. majus*: no issues are foreseen with other species in this genus.
- *Beauveria bassiana.*
- *Isaria (Paecillomyces)* and *Purpureocillium spp.*
- *Neurospora crassa* (a standard research organism).
- *Pochonia clamydosporium* (the 20 µm conidia are collected from the second chamber).
- *Trichoderma* spp. including: *T. asperellum, T. ovalisporum*, and *T. stromaticum*; MH extraction works especially well with powdery species in the *T. harzianum* group.

More information on MycoHarvesters and biopesticides is available on www.dropdata.org and www.mycoharvester.info; commercial enquiries to VBS (agriculture) Ltd. (UK company).